

# Science of Toys



# Bouncy Balls

# Part 1: What is a bouncy ball?

► Add these questions to page 5 of your HDSN!

1. What are its physical properties? \_\_\_\_\_

\_\_\_\_\_

2. Why does it bounce? \_\_\_\_\_

\_\_\_\_\_

3. What materials are used to make one? \_\_\_\_\_

\_\_\_\_\_

4. How is it made? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

► What other questions do you have? Add them to your list.

► Use Internet resources to find the answers. Be prepared to share them with your class tomorrow!

# What did you discover?

1. What are its physical properties?

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2. Why does it bounce?

Link 1: <http://www.unc.edu/~brads/bouncingballs.html>

Link 2: <http://www.ccmr.cornell.edu/education/ask/?quid=201>

Link 3: <http://www.york.ac.uk/media/cii/documents/rubberbounce.pdf>



3. What materials are used to make one? \_\_\_\_\_

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4. How is it made? \_\_\_\_\_

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Link 1: <http://www.youtube.com/watch?v=Jc68dnuU4wQ>

Link 2: <http://video.about.com/chemistry/How-to-Make-a-Bouncy-Ball.htm>

# Part 2: The Challenge

*Which bouncy balls are the “bounciest”?*

## **Think About It:**

- 1 – What will we need to do to find out the answer?
- 2 – How will we get the information we need?
- 3 – How can we be sure our results are accurate and reliable?

# Designing Your Experiment

## My Experiment

1. Pick out three balls.
2. Drop from the same height.
3. Record how high each one bounces.
4. Pick the one that bounces the highest.

**Work with your teammates to design an experiment that includes the answers to the questions we just discussed.**

**Write your procedures (steps for an experiment) on page 4 of your HDSN. You will need to have it approved by the end of class tomorrow!**

# Experimental Design

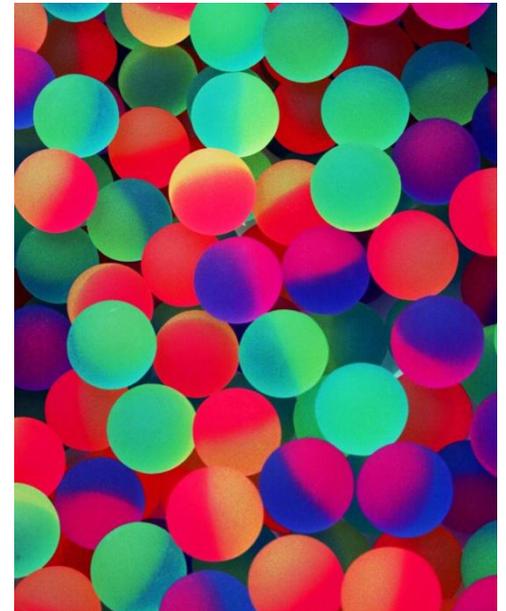
Glue the worksheet on page 4 (FAF) of your HDSN.

Complete the vocabulary section using the information provided by your teacher.

## Did you know?

The first bouncy ball was the **Super Ball** (aka **Super Ball**), which was a toy based on a type of synthetic rubber invented in **1964** by chemist Norman Stingley. It is an extremely elastic ball made of **Zectron** which contains the synthetic polymer polybutadiene as well as hydrated silica, zinc oxide, stearic acid, and other ingredients.

Source: [http://en.wikipedia.org/wiki/Super\\_Ball](http://en.wikipedia.org/wiki/Super_Ball)



# Experiment



**A scientific procedure used to test a hypothesis, make a discovery, or demonstrate a fact.**

# Control

**The part of the experiment  
that is not tested; used for  
comparison to determine the  
outcome**

# Variable

**Any part of an experiment  
that can change**

**Independent Variable** - The variable that is changed; what we test

**Dependent Variable** - The variable that is affected by the independent variable or the part that we measure.

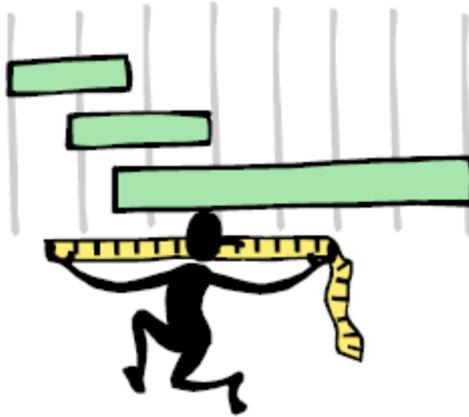
# Accurate



**Correct in all  
details; exact.**

# Reliable

**Consistently good in quality or performance; able to be trusted.**



# Procedure

**The steps (or process)  
used to conduct an  
experiment.**



# Data

**Information  
collected during  
an experiment.**



# What's your procedure?

Follow your teacher's directions to complete the procedure for testing the bouncy balls.

1. Pick out \_\_\_\_\_ balls that are the same \_\_\_\_\_, but different \_\_\_\_\_.

*Make a prediction ... What do you think will happen?* \_\_\_\_\_

2. Set up an area to drop the balls. The drop height will be equal to \_\_\_\_\_ meters and all the balls will bounce off a \_\_\_\_\_ surface.

3. Test the first ball by dropping it from the drop height. Record the height of the bounce in \_\_\_\_\_ by measuring from the \_\_\_\_\_ of the ball. Record your data in the chart.

4. Repeat step 3 with the same ball for a total of \_\_\_\_\_ trials (times).

5. Test the other balls the same way by repeating steps 3-4.

# **Create a DATA CHART**

**Use the space on the back of your worksheet to create a chart for your data. Calculate the averages for each ball and write them in the chart. Round to 2 decimal places if needed.**

# Try It

Do the experiment by following the steps we just finished.

Remember ... be as accurate as possible with your measurements!

**Done? Write your conclusion. Be sure to include ...**

- ✓ **Was your prediction correct? Why or why not?**
- ✓ **Which ball was the best bouncer?**
- ✓ **What does your data show?**